

### **REMARKS**

Claims 2-8, 15, 16 and 18-27 are pending in the present application. Claims 2-5, 7, 8 and 15 have been amended. Claims 20-27 have been presented herewith. Claims 1, 9-14 and 17 have been canceled.

### **Priority Under 35 U.S.C. 119**

Applicant notes the Examiner's acknowledgment of the Claim for Priority under 35 U.S.C. 119, and receipt of the certified copy of the priority document.

### **Election of Species**

The Examiner is respectfully requested to reconsider the Election of Species Requirement, and examine claims 15, 16 and 18 as readable on elected Species I – Fig. 5 of the present application.

Although not necessarily limited thereto, the plurality of third electrodes “formed evenly spaced between the first electrode and the second electrode, wherein the third electrodes generate polarization” of claim 15, may be interpreted as projection electrodes 132 as formed on bottom electrode 131 as illustrated in Fig. 5. The Examiner is therefore respectfully requested to examine claims 15, 16 and 18, along with claims 2, 3, 7 and 8, as reading on elected Species I – Fig. 5. **In the event that claims 15, 16 and 18 are deemed as not readable on elected Species I – Fig. 5, the Examiner is respectfully requested to provide detailed reasons why.**

**Claim Rejections-35 U.S.C. 102**

Claims 1 and 8 have been rejected under 35 U.S.C. 102(b) as being anticipated by the Aoki et al. reference (U.S. Patent No. 6,033,953). Claim 1 has been canceled. The Examiner is thus respectfully requested to withdraw this rejection.

**Claim Rejections-35 U.S.C. 103**

Claims 2, 3 and 7 have been rejected under 35 U.S.C. 103(a) as being unpatentable over the Aoki et al. reference in view of the Lu reference (U.S. Patent No. 5,679,596). This rejection, insofar as it may pertain to the presently pending claims, is traversed for the following reasons.

Claim 2 has been amended to be in independent form, as including the features of base claim 1, which has been canceled. Claim 2 thus includes in combination a bottom electrode; a plurality of projection electrodes formed on the bottom electrode; a ferroelectric layer; and a top electrode, wherein "spacing between central portions of each projection electrode has a range from 10% to 20% of a size of the ferroelectric capacitor". Applicant respectfully submits that the ferroelectric capacitor of claim 2 would not have been obvious in view of the prior art as relied upon by the Examiner for at least the following reasons.

The Examiner has interpreted pointed convex parts 38a existing on bottom electrode 38 in Fig. 14 of the Aoki et al. reference as the projection electrodes of claim 2. The Examiner has however acknowledged that the Aoki et al. reference fails to

teach spacing between central portions of each pointed convex part 38a as having a range from 10% to 20% of a size of the ferroelectric capacitor. In order to overcome this acknowledged deficiency, the Examiner has asserted that the Lu reference teaches polysilicon pillars 14b as shown in Fig. 5 that have a spacing between central portions thereof within a range of 10% to 20% a size of the capacitor. The Examiner has alleged that it would have been obvious to provide the spacing as taught in the Lu reference between pointed convex parts 38a of the Aoki et al. reference, to obtain desired increased capacitance. Applicant respectfully disagrees for the following reasons.

As described beginning in column 1, line 35 of the Aoki et al. reference with respect to Fig. 14, bottom electrode 38 composed of platinum or iridium is laminated on barrier metal layer 39. As specifically described in column 1, lines 50-56 of the Aoki et al. reference, the surface of platinum bottom electrode 38 manifests a rough surface with many pointed convex parts 38a. This is due to the fact that particles of platinum adhere in a conical shape during sputtering or vapor deposition.

As acknowledged by the Examiner, pointed convex parts 38a existing on bottom electrode 38 in Fig. 14 of the Aoki et al. reference are not formed with specified spacing therebetween. It should thus be understood that pointed convex parts 38a are formed irregularly, as the particles of platinum adhere randomly during sputtering.

The Examiner has asserted that it would have been obvious to space each pointed convex part 38a apart from each other within a range of 10% to 20% of a size

of the ferroelectric capacitor in view of the Lu reference.

However, it is unclear how pointed convex parts 38a in Fig. 14 of the Aoki et al. reference could possibly be formed as each having spacing therebetween within the recited range, or as having any particular spacing. Particularly, pointed convex parts 38a in Fig. 14 of the Aoki et al. reference appear to be randomly formed on bottom electrode 38a during sputtering as the platinum particles adhere to each other in conical shape. The Aoki et al. reference does not suggest how, and the Examiner has not described how, pointed convex parts 38a of the Aoki et al. reference could be formed as each having specified spacing therebetween.

Moreover, even assuming for the sake of argument that pointed convex parts 38a in Fig. 14 of the Aoki et al. reference could each be formed as having specified spacing therebetween (which Applicant does not concede), it is unclear why one of ordinary skill would be motivated to do so. The Aoki et al. reference would appear to teach in column 1, lines 50-57 that pointed convex parts 38a on bottom electrode 38 are undesirable. In the preferred embodiments of the Aoki et al. reference, the pointed convex parts are polished so as to flatten the surface of the bottom electrode. In contrast, polysilicon pillars 14b in Fig. 5 of the Lu reference are described in column 5, lines 22-27 as formed so as to increase surface area of bottom electrode 11, so as to increase capacitance. It is unclear why one of ordinary skill would be motivated to provide specified spacing between pointed convex parts 38a, when the Aoki et al. reference appears to teach that such pointed convex parts are undesirable and should

be flattened. Accordingly, Applicant respectfully submits that the ferroelectric capacitor of claim 2 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, and that this rejection, insofar as it may pertain to claims 2 and 8, is improper for at least these reasons.

Claim 3 has been amended to include the features of base claim 1, wherein "a size of each projection electrode has a range from 5% to 10% of a size of the ferroelectric capacitor". Applicant respectfully submits that the ferroelectric capacitor of claim 3 would not have been obvious in view of the prior art as relied upon by the Examiner for at least the following reasons.

Applicant respectfully submits that it is unclear how pointed convex parts 38a in Fig. 14 of the Aoki et al. reference could be formed as each having size in a range from 5% to 10% of a size of the ferroelectric capacitor, as would be necessary to meet the features of claim 3. Moreover, as emphasized above, the Aoki et al. reference appears to teach that convex parts 38a are undesirable, and are thus polished to provide a flattened bottom electrode. It is unclear why one of ordinary skill would be motivated to modify the structure in Fig. 14 of the Aoki et al. reference so that each of pointed convex parts 38a have a size in the recited range. Applicant therefore respectfully submits that the ferroelectric capacitor of claim 3 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, and that this rejection is improper for at least these reasons.

Claim 7 has been amended to be in independent form including the features of

base claim 1, wherein “the projection electrodes are arranged evenly spaced on the bottom electrode”. Applicant respectfully submits that the ferroelectric capacitor of claim 7 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together for at least somewhat similar reasons as set forth above with respect to claim 1. It is unclear how pointed convex parts 38a in Fig. 14 of the Aoki et al. reference could be formed as arranged evenly spaced on bottom electrode 38. Moreover, it is unclear why one of ordinary skill would be motivated to modify the structure in Fig. 14 of the Aoki et al. reference so that each of pointed convex parts 38a are evenly spaced, and it is unclear how this would increase capacitance.

#### **Claims 15, 16 and 18**

As noted above, Applicant respectfully requests reconsideration of the Election Requirement, and examination of claims 15, 16 and 18 as readable on elected Species I – Fig. 5.

The ferroelectric capacitor of claim 15 includes in combination a first electrode; a second electrode; a ferroelectric layer “which is sandwiched between the first electrode and the second electrode”; and a plurality of third electrodes “formed evenly spaced between the first electrode and the second electrode, wherein the third electrodes generate polarization”. Applicant respectfully submits that the ferroelectric capacitor of claim 15 would not have been obvious in view of the prior art as relied upon by the

Examiner taken singularly or together for at least the following reasons.

Applicant respectfully submits that as emphasized above, it is unclear how each of pointed convex parts 38a in Fig. 14 of the Aoki et al. reference could be formed as evenly spaced on bottom electrode 38 as would be necessary to meet the features of claim 15. Moreover, for at least somewhat similar reasons as set forth above, it is unclear why one of ordinary skill would be motivated to modify the structure in Fig. 14 of the Aoki et al. reference so that pointed convex parts 38a are evenly spaced, and it is unclear how this would increase capacitance. That is, the Aoki et al. reference would appear to teach in column 1, lines 50-57 that pointed convex parts 38a in Fig. 14 are undesirable, and are thus polished to provide a flattened bottom electrode. Applicant therefore respectfully submits that the ferroelectric capacitor of claim 15 would not have been obvious in view of the prior art as relied upon by the Examiner taken singularly or together, and that this rejection, insofar as it may pertain to claims 15, 16 and 18, is improper for at least these reasons.

#### **Claims 23 and 27**

Applicant respectfully submits that claims 23 and 27 as presented herewith are readable on elected Species I – Fig. 5. The Examiner is therefore respectfully to examine claims 23 and 27 as readable on the elected Species. Applicant also respectfully submits that claims 23 and 27 should be found allowable at least by virtue of respective dependency upon claims 3 and 7, for at least the reasons as set forth

previously.

**Claims 4-6, 19-22 and 24-26**

Applicant respectfully requests the Examiner to rejoin claims 4-6 and 19, which should be found allowable at least by virtue of respective dependency upon claims 2 and 15.

Applicant also respectfully notes that claims 20 and 24 may be interpreted as readable on non-elected Species V – Fig. 12, and that claims 21, 22, 25 and 26 may be interpreted as readable on non-elected Species III – Fig. 10. The Examiner is respectfully requested to rejoin claims 20-22 and 24-26, which should be found allowable at least by virtue of respective dependency upon claims 3 and 7.

**Conclusion**

Applicant respectfully submits that since claims 2, 3 and 7 have been amended merely to be in independent form and thus have the same scope as originally presented, the above noted amendments to claims 2, 7 and 8 should not be construed as narrowing scope within the meaning of *Festo*. Also, the amendments to claims 4 and 5 have been made merely to improve antecedent, rather than to further distinguish over any of the relied upon prior art. The amendments to claims 4 and 5 also should not be construed as narrowing scope within the meaning of *Festo*.

The Examiner is respectfully requested to reconsider and withdraw the



corresponding rejections, and to pass the claims of the present application to issue, for at least the above reasons.

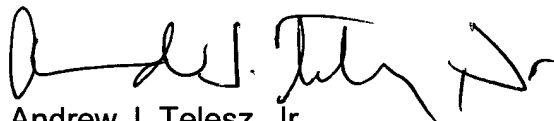
In the event that there are any outstanding matters remaining in the present application, please contact Andrew J. Telesz, Jr. (Reg. No. 33,581) at (571) 283-0720 in the Washington, D.C. area, to discuss these matters.

Pursuant to the provisions of 37 C.F.R. 1.17 and 1.136(a), the Applicant hereby petitions for an extension of two (2) months to December 26, 2005, for the period in which to file a response to the outstanding Office Action. The required fee of \$450.00 should be charged to Deposit Account No. 50-0238.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment for any additional fees that may be required, or credit any overpayment, to Deposit Account No. 50-0238.

Respectfully submitted,

VOLENTINE FRANCOS & WHITT, P.L.L.C.

A handwritten signature in black ink, appearing to read 'Andrew J. Telesz, Jr.', with a stylized flourish at the end.

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